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BLOC INTERNATIONAL GEOPHYSICAL COOPERATION
- 1960

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INFORMATION ON INTERNATIONAL GEOPHYSICAL COOPERATION --

SOVIET-BLOC ACTIVITIES

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I. ROCKETS AND ARTIFICIAL EARTH SATELLITES

"Pravda" Notes the One-Month Anniversary of the Soviet Spaceship

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The Soviet spaceship launched on 15 May 1960 had completed 486 revolutions around the Earth at 1800 hours on 15 June; during the past month it has travelled 20.9 million kilometers.

During this same time the last stage of the rocket-carrier has completed 501 revolutions and has covered a distance of 21.1 million kilometers.

From the moment when the spaceship shifted into its new orbit its period of revolution decreased by 5.4 seconds and is presently equal to 94.16 minutes. The apogee and perigee of the spaceship's orbit on 19 May were 690 and 306.5 km respectively, but on 15 June these had decreased to 675 and 304.5 km respectively.

The airtight cabin which has been separated from the spaceship is continuing its movement in an orbit close to the spaceship's orbit but is lagging behind it by approximately 16 minutes.

When the last stage of the rocket-carrier was put into orbit its period of revolution was 91.2 minutes; its apogee and perigee were 369 and 315 km respectively. During the past month the period of revolution of the last stage of the rocket has been cut down to 90.65 minutes, while the apogee and perigee have decreased to 315 and 309 km respectively.

Observations of the movement of the spaceship by means of optical and radio-technical equipment are being successfully continued. The radio signals of the "Signal" transmitter installed aboard the spaceship and operating on a frequency of 19,995 mc are being clearly received by radio stations and radio enthusiasts throughout the world.

Measuring stations in the Soviet Union, using data received from the "Signal" transmitter, are constantly checking pressure and temperature aboard the spaceship. The processing of the derived data indicates that temperature and pressure on the spaceship continue to remain within the limits established. On 16 June the spaceship may be observed visually in the morning hours before sunrise from 50° N. to 40° S.

("Spaceship Continues its Travels", Pravda, 16 June 1960, p. 1)

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II. UPPER ATMOSPHERE

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Fesenkov Claims the Tunguska Meteorite Actually a Comet -- A "Pravda" Report

Kiev. 2 June. (By telephone). An All-Union Conference, called by the Committee on Meteorites of the Academy of Sciences of the USSR, opened today in Kiev. A number of reports were heard that dealt with the study of the Tunguska meteorite.

This meteorite, which has become world-famous, fell into the Siberian taiga near the Podkamennaya Tunguska River more than 50 years ago.

A report made by Academician V. Fesenkov was of special interest. The Tunguska phenomenon of 1908, in his opinion, was not a case of an ordinary meteorite falling to the Earth, but the collision of a comet with the Earth. The collected material on the Tunguska meteorite permits us to conclude that it was the body of a small comet consisting of a mass of solidified gases with an admixture of iron and silicate particles.

("The Tunguska Meteorite -- the Head of a Comet", Pravda, 3 June 1960, p. 6)

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"Pravda" Reports on a Television Telescope

Pulkovo. 9 June. (By telephone). The fabrication of the mechanical parts for the first television telescope has been completed in the workshops at the Pulkovo Observatory. This telescope was designed by the astronomer N. F. Kuprevich. An experiment with the use of the experimental model has shown the high qualities of the telescope. Due to the brightness of the image on the television screen there is a considerable decrease in the time of exposure in photographing and there is a greater clarity in the image of the observed object. For example, in observations of the Moon its image is 500 to 600 times greater than the brightness resulting from the use of the optical system of the same instrument. The television telescope will be installed in 1960 in a special pavilion that is now under construction.

Among the newest instruments which have been added to the Pulkovo Observatory recently is a large reflector with automatic control and a new photoelectric transit instrument for the time service; the latter was designed by Professor N. N. Pavlov and others. ("Television Telescope", Pravda, 10 June 1960, p. 6)

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"Leningradskaya Pravda" Publishes Feature Article on the Pulkovo Observatory

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Every Russian from childhood knows that Pulkovo is the astronomical capital of the world. After destruction by the Germans in the Second World War it was not fully restored until 1953.

This feature article centers around four former soldiers who once fought in the vicinity of Pulkovo and who now are research scientists or mechanics at the observatory. ("Soldiers from the Pulkovo Meridian", by Z. Ustinova, Leningradskaya Pravda, 12 May 1960, p. 4)

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S. N. Vernov Reviews Importance of Research on the Radiation Belts and Cosmic Rays

A great deal of attention has been shown in a report by Corresponding Member S. N. Vernov. His paper was presented on 10 June at a general meeting of the Academy of Sciences of the USSR. His subject was the latest research in the field of cosmic rays. Corresponding Member Vernov supplied our correspondent with the following:

"The creation of artificial earth satellites and cosmic rockets has made it possible for the first time to investigate cosmic space and discover phenomena which had remained even unsuspected until quite recently".

"It has become clear that the Earth is surrounded by two belts of radiation - an inner and outer. The first embraces the zone of relatively low latitudes around the globe and after a fashion is drawn tightly about the tropical regions; the second is situated almost over the entire planet but only approaches the Earth's surface in the high latitudes".

"The intensity of the radiations in these belts is very great. Because of it we are faced with the problem of the harmful reaction of radiation on future space travellers. This circumstance must be taken into account when building space-ships".

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"The variability of the outer radiation belt has been duly recorded; it is subject to the direct bombardment of streams of corpuscles ejected by the Sun. These streams are associated with the condition of the Sun and their intensity constantly changes".

"Up until quite recently scientists figured that the energy of the electrons (the principal component of the outer belt) was comparatively small -- approximately 10 to 100,000 ev. Scientists have now demonstrated the existence in the outer radiation belt of a large number of electrons with an energy of about 1,000,000 ev. The presence of electrons with high energies creates special difficulties for future space explorers".

"Curious results have come from the study of the lower boundary of the inner belt. It has been successfully established that it begins over America at a height of 600 km and over Australia at a height of 1,600 km. This is due to the fact that the center of the Earth's magnetic field does not coincide with the center of our planet".

"The origin of the outer radiation belt of the Earth still remains a mystery to scientists. It seems to me that the cause for the development of the Earth's outer belt must be sought for in the corpuscular streams emanating from the Sun. This does not exclude the possibility that near the Earth a peculiar natural 'accelerator' is operative where great variations in the intensity of the magnetic field occur".

"It is not only the Earth that has a magnetic field, of course. In general such fields are no rarity in cosmic space. This should lead to a concentration of radiations in different regions of the cosmos in the form of peculiar radiation belts".

"Experiments made by Soviet scientists have shown that once a month on an average the Sun becomes a source of radiation of cosmic rays. Explosive processes arise on the Sun on these occasions. The entire solar system at this period of time becomes a gigantic 'particle trap'. The intensity of cosmic rays at this time is so great that a man under such conditions cannot be present in interplanetary space without special protective equipment".

"It is still impossible to predict explosive processes on the Sun. Meanwhile such 'solar' weather can be dangerous for interplanetary travellers. Fortunately when there are explosions on the Sun the resultant cosmic rays are of relatively low energies. It is possible to protect oneself from these rays by means of special shields; this, to be sure, leads to a considerable increase in the weight of space-ships".

"The investigation of the particles of superhigh energies that are found in the cosmic rays is also of great importance for the study of parts of the universe that are remote from the Earth. At the present time it may be assumed that the particles of superhigh energies originate beyond the limits of our Galaxy. Thus, by means of cosmic rays it is possible to accomplish an extraordinary 'X-raying' of cosmic space".

("In the Far Reaches of the Universe", Izvestiya, 12 June 1960,

p. 6) CPYRGHT

Additional Report Published About the Yardymly Meteorite

The following is a summary of a feature article appearing in Sovetskaya Rossiya on 12 May 1960:

An iron meteorite fell in the Azerbaydzhan SSR on 24 November 1959. It has been called the Yardymly meteorite after the village of Yardymly near which it fell. Scientists of the Azerbaydzhan Academy of Sciences have succeeded in collecting 5 fragments that had been scattered over an area of several dozen square kilometers; these varied in weight from 127 kilograms to 360 grams.

This article contains much of the same data contained in an article published by the Azerbaydzhan Academy of Sciences, summarized in a recent issue of this IGC publication.

This article, written by Ye. Krinov, Scientific Secretary of the Committee on Meteorites of the Academy of Sciences of the USSR, contains much material describing the importance of the study of meteorites in general.

The author indicates that much work is now being done for the measurement of the cosmogenic isotopes in the Yardymly meteorite. This work is being carried on at the Institute of Geochemistry and Analytical Chemistry and in the Radium Institute of the Academy of Sciences of the USSR. Samples of this meteorite also have been supplied to foreign scientists, including three in the United States. ("Messengers of Space", by Ye. Krinov, Sovetskaya Rossiya, 12 May 1960, p. 4)

Chairman Mustel' Reports on the Work of the Commission for Investigation of the Sun

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Several days ago an announcement appeared in the city railway station at Kiyev. It began with the words: "The members of the Plenary Session of the Commission for Investigation of the Sun invite you...".

The Commission for Investigation of the Sun! Even in our century of earth satellites this seems fantastic! However, such a commission actually exists in the Astronomical Council of the Academy of Sciences of the USSR.

Scientists gathered from the entire Soviet Union at the annual plenary session of the Commission during its five-day meeting in Kiyev. On 7 June the plenary session completed its work. We have asked the Chairman of the Commission to tell about the results of its work. The chairman is E. R. Mustel', Corresponding Member of the Academy of Sciences of the USSR.

"It is evidently not necessary to say a great deal about the role of the Sun in all the processes taking place on the Earth", said Professor E. R. Mustel'. "Not only the theoretical but also the practical importance of the study of the Sun is understood by everyone".

"Two principal tasks presently confront the scientists who are investigating our Sun. The first of these is the study of the Sun as the star nearest to the Earth. All other stars are situated so far away that even in the most powerful telescope we see them only as luminous points. It is a different matter with the Sun. We can study its photosphere -- the lowest layer of its atmosphere; the chromosphere -- situated above it; finally -- the corona, the outermost layer, etc. From the first problem -- the astrophysical investigation of the Sun, follows the second: the practical study of solar activity -- the combination of sometimes very rapid physical processes which transpire in the Sun's atmosphere and which are accompanied by extremely noticeable radiation in the ultraviolet and Roentgen regions of the spectrum. The influence of solar activity on various terrestrial phenomena is great. Direct consequences of solar activity [include] magnetic storms, auroras, and the disruption of radio communications".

"The work of the plenary session was conducted in the light of these two problems. About 60 scientific reports and communications were heard during the session".

"A great deal of discussion developed on the problem of the origin of chromospheric flares and about streams of solar corpuscles -- the "parties" directly responsible for the disruption of radio communications. At the present time Soviet scientists have presented a series of convincing facts showing that the sources of these streams are the active regions on the Sun and the Sun's corona situated above them. This is very important for the prediction of disruptions in radio communications".

"Moving on, I wish to say that the next plenary session of the Commission will be held in Moscow next year; it will be devoted to the development of ways to make predictions of disruptions of radio communications".

"About twelve scientific institutions in the Soviet Union are engaged in the investigation of the Sun. One of the largest of these centers is the Crimean Astrophysical Observatory, directed by Professor A. B. Severniy, Corresponding Member of the Academy of Sciences of the USSR. The representatives from this institution presented a great deal of interesting work; in particular, I Shi-hwai, a research student at the observatory, reported on the results of the investigation of protuberances -- immense red-hot clouds situated over the photosphere. He has succeeded in collecting very interesting data by the use of the new instruments which we have developed in this country".

"The institutions engaged in the investigation of the Sun are situated in various regions of our country. There is a 'sun station' in a mountainous taiga section of the Far East, near the city of Ussuriysk. The small team of workers at this station has made a series of rare photographs of chromospheric flares".

"The plenary session has demonstrated that much progress has been made during the past year on the study of the Sun, despite a number of exceptional difficulties. In the coming year it is planned to hold a series of conferences on problems involved in the investigation of the Sun -- these in preparation for the International Astronomical Congress which will be held in the United States in August 1961".

("Secrets of the Sun", Izvestiya, 8 June 1960, p. 6)

Stellar Observations at the Odessa Observatory

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CPYRGHT Odessa. 11 June (TASS). At the beginning of March of the present year the

Norwegian astronomer Olaf Hassel discovered the flareup of a bright new star on the boundary of the constellations Hercules and Aquila. Later on its brightness became less and less.

The process of extinction, continuing until the present time, is being observed by workers at the Odessa Observatory and by other astronomers. The Odessa Observatory is the international center for the coordination of research on the so-called variable stars.

A TASS correspondent has asked the observatory director, V. P. Tsesevich, a Corresponding Member of the Academy of Sciences of the Ukrainian SSR, to tell about these observations.

"Our observatory", reported Professor Tsesevich, "is systematically engaged in the study of variable stars, permitting a deeper penetration into the secrets of the Universe. Man is approaching the solution of riddles of the cosmos, including the flaring up of a bright new star. Photographic and visual observations are being made of it. By means of a multi-camera astrograph which we have constructed we have already made more than fifty photographs of the star; these show a gradual decrease in its brightness".

"Investigations by astronomers determine to what type of new stars the recently discovered one belongs. It is now possible to assume that it belongs to the rapidly-changing type".

"But what happens in space?"

"This star did not just now flare up; it was approximately three thousand years ago. It is very far from us and its bright light reaches us only after the lapse of many centuries".

"A small compressed star began to expand with immense velocity as a result of a powerful nuclear explosion in its interior. Its outer envelope was ejected into space and the brightness of the star was temporarily magnified many times. Now this envelope is being scattered and the core, stripped of this covering, is returning to its former condition. Despite the immensity of this catastrophe, the star only lost 1/100,000th part of its mass as a result of casting off its envelope. Its next flareup is to be expected no sooner than 100,000 years from now".

"These and other phenomena are expanding our knowledge of the stars and the sources of their internal energy". ("A New Star in the Objective of the Astrograph", Sovetskaya Aviatsiya, 12 June 1960, p. 4)

All-Union Conference on Study of the Ionosphere Held at Rostov-on-Don

The following is the text of a brief article recently appearing in Turkmen-skaya Iskra:

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The work of the All-Union Conference on the Study of the Ionosphere, which has been meeting at Rostov-on-Don, has now been completed. The persons participating in the conference have summed up the first results of research in this important field of science, pursued in accordance with the Program of the International Geophysical Year and the International Geophysical Cooperation Program.

At the plenary sessions reports and communications were heard from scientists who had come from all parts of the country. The following persons from Turkmeniya attended the conference: N. M. Yerofeyev, Candidate in Physical-Mathematical Sciences, Corresponding Member of the Academy of Sciences of the Turkmen SSR, and the following associates of the Physical-Technical Institute of the Academy of Sciences of the Turkmen SSR -- V. P. Pereygin, Ye. K. Dubrovskaya and M. Shirmamedov. All the reports and communications presented by the scientists from Turkmeniya were recommended for publication by the Interdepartmental Committee.

Plans call for the holding of a similar conference at Ashkhabad at the end of 1961. ("Conference on Study of the Ionosphere", by D. Allaberdyev, Turkmen-skaya Iskra, 12 May 1960, p. 4)

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Comments on the Activities of the Institute of Geophysics of the Georgian SSR

A working group in the Cosmic Rays Laboratory of the Institute of Geophysics of the Academy of Sciences of the Georgian SSR, with the assistance of modern instruments -- an ionization chamber, a cubic telescope and a neutron monitor, is conducting a continual recording and study of variations in the intensity of cosmic rays.

The working group of the laboratory took part in the research at the time of the International Geophysical Year and is now continuing the cycle of these observations.

The study of variations in the intensity of cosmic rays is of great significance for problems of the physics of cosmic rays, astrophysics, heliophysics, geophysics and meteorology.

The instruments set up in the laboratory react to such rare natural phenomena as flares on the Sun and geomagnetic and ionospheric perturbations. A junior scientific worker at the laboratory, I. Chkhetiya, has devised an original instrument -- a "pulsograph". Using this instrument these phenomena are continually recorded on a continuous photographic film whereas previously they were recorded as individual still photographs.

The laboratory workers are studying the influence of temperature in all layers of the atmosphere, atmospheric pressure, the Earth's magnetic field and solar perturbations on the intensity of cosmic rays. A study of the interrelations between these phenomena and variations in the intensity of cosmic rays will enable us to forecast flares on the Sun and learn the temperature of the upper layers of the atmosphere without measuring it directly.

The photographs accompanying the original article show junior scientific worker I. Chkhetiya preparing his "pulsograph" for operation and junior scientific worker T. Shakarishvili working on an ionization chamber. ("In the Cosmic Ray Laboratory", Zarya Vostoka, 12 May 1960, p. 4)

Academician Barabashov Reports on the "Mysteries of Venus"

An Izvestiya article of 10 June 1960, written by N. Barabashov, Academician of the Academy of Sciences of the Ukrainian SSR, is one of a series of articles on similar subjects which are regularly appearing in that newspaper. Entitled "The Mysteries of Venus", the article is little more than a review of the astronomical study of the planet since its discovery and a listing of those physical characteristics that are available in ordinary textbooks or encyclopedias. Barabashov's concluding paragraphs are quoted in full below:

"Observations conducted at the Observatory of Khar'kov State University over a period of years enable us to draw the conclusion that Venus is surrounded by a dense atmosphere which prevents us from directly observing the surface of that planet. This layer is subject to constant variations in height and this causes certain changes in the color of Venus. Certain large particles float in the atmosphere of Venus. The number of such particles in its atmosphere is variable; it increases in the morning and evening hours in relation to midday".

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"The immense amount of carbon dioxide, the small content of oxygen and the relatively high temperature -- all taken together, lead us to believe that Venus is now in the condition that our Earth was in millions of years ago, in the Carboniferous period. It is possible that life on Venus is just developing. Or possibly it already exists in forms still unknown to us".

"Now, when Soviet science has opened before us the broadest possibilities for the study of the cosmos and astronomy has become a practical science, the time is not far off when we will solve the mysteries which Venus -- the Earth's nearest neighbor -- is hiding from us". ("Mysteries of Venus", by N. Barabashov, Izvestiya, 10 June 1960, p. 6)

Giant Radio Telescope Under Construction Near Moscow

The following is the full translation of an article recently appearing in the Soviet Press:

For astronauts planning on travels in space there will one day be guidebooks like those which are now used by ordinary travellers by automobile. Among the great many directions contained in such a guide the section written by radio astronomers will occupy a prominent place.

Radio astronomy is still a young science which has become independent in the post-war years. Scientists therefore sometimes modestly compare its status with the optical astronomy of past centuries. It is worth while, however, to take a look at the powerful instruments used by radio astronomers and become acquainted with the research which they are conducting in order to convince ourselves of the rapid pace with which this science is advancing.

We visited the radioastronomical station of the P. N. Lebedev Physical Institute of the Academy of Sciences of the USSR near Moscow. A small and amicable staff of radio astronomers occupies several small comfortable buildings there.

The mirror-like radio telescope turns in different directions easily, as if it were a child's toy; its "dish" resembles a fantastic plate. Its parabolic reflecting surface is 22 meters in diameter and is covered by a sheet of duralumin. It receives radio signals from distant space -- from the planets, the Sun, the Moon, and distant galaxies, and reflects them on the horn antenna. The received data are then processed by machines and instruments located below the "dish". By use of special computers the operator can activate the telescope in such a way that it "independently" tracks the observed object, turning in accordance with the object's movement.

"In the precision of its fabrication the surface of the reflector-dish of our radio telescope is the best in the world", reported engineer D. V. Kovalevskiy. "This makes it possible to make investigations on extremely short waves -- even those shorter than 1 cm".

A. D. Kuz'min and A. Ye. Salomonovich, Candidates in Physical-Mathematical Sciences, told about research on radio radiation from the Moon. The radio waves which have been emitted from the subsurface strata of the Moon, not from the surface itself, have "told" scientists the temperature of these invisible "sublunar" strata. It has become clear that their temperature increases only after prolonged heating of the Moon's surface by the Sun; the deeper-lying strata do not at all "feel" the Sun's warmth: frost is always present at such depths -- minus 20°-30°.

New data has been derived relative to the planet Venus by use of the radio telescope. The surface of Venus cannot be seen in optical telescopes: it is covered by a dense layer of clouds. Radio waves penetrate through the clouds and yield information about the temperature of the planet itself. It is rather great -- about plus 100°.

During the investigation of distant worlds the radioastronomers have discovered that the density of the energy arriving at the Earth's surface has become unusually small due to the immense distances that it has travelled. Even a large 22-meter radio telescope is unable to "trap" the low-intensity beams of electromagnetic rays coming from distant heavenly bodies.

It is therefore necessary to build a still larger radio telescope. The following describes its shape and dimensions: its metal masts extend for a kilometer to the edge of the forest. Immense beams have already been lifted onto several of them; these beams resemble arcs. These will be connected by numerous wires which will form a screen. Still higher up there will be dipole antennas. They will receive the waves reflected by the screen. A second such kilometer-long screen, 40 meters wide, will be built perpendicular to the first. Due to the arrangement of the screen in the form of a cross the radio telescope in its capacity to "trap" radio waves will be equivalent to a mirror-like radio telescope with a diameter of one kilometer.

"By means of this giant", says the chief of the radioastronomical station, V. V. Vitkevich, "we plan to investigate the edge of the Universe; that is more than 10 billion light-years distant from the Earth".

We examined the station and the technical equipment in current use -- the 22-meter mirror-like telescope, and the technical equipment of the not-too-distant future -- the cross-shaped radio telescope, the world's largest.

"But we must not underestimate the technical equipment already in use, these small radio telescopes that at first glance seems so simple and obsolete," said V. V. Vitkevich smilingly as he led us to a square apparatus not too far off.

The scientist related how these small radio telescopes were used to discover the so-called "outer corona" of the Sun -- a mantle consisting of clouds of electrons surrounding that luminary on all sides and extending outward from it for a distance of more than 30 solar radii.

The radio astronomers will study the structure of the Universe, the movement of heavenly bodies, the caprices and menacing "character" of the cosmos, and the processes taking place in highly rarefied space -- processes unseen with optical instruments. (The article is accompanied by a photograph of the 22-meter "dish" of the radio telescope currently in use.) ("Radio Telescopes -- Giants", by V. Petrusenko, Pravda, 5 June 1960, p. 6)

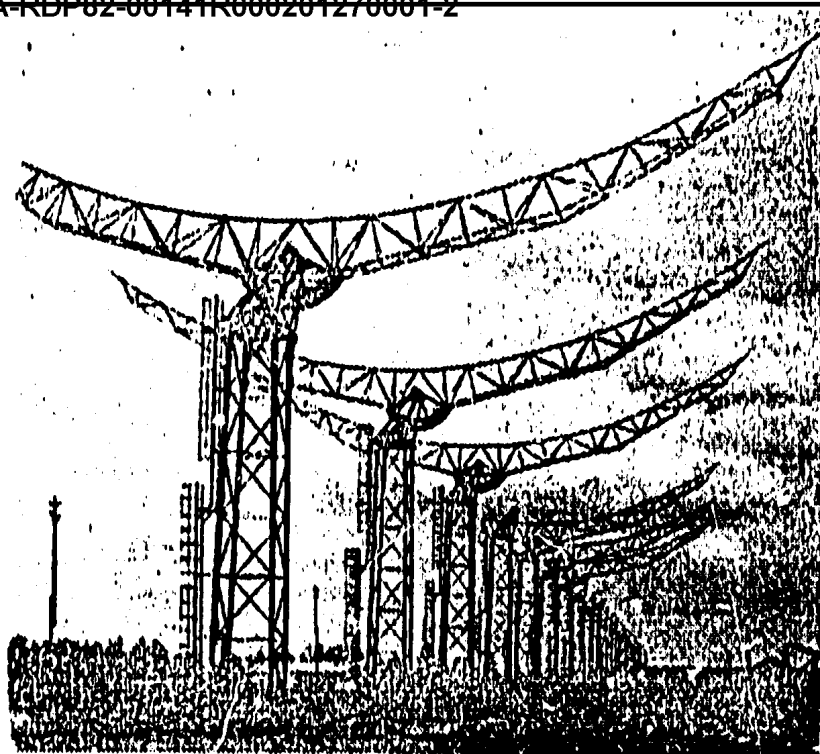


Figure 2. Construction of the cruciform radio-telescope. The telegraph pole which can be seen to the left in the picture graphically shows the size of this instrument.



Figure 1. 22-Meter Reflector Radiotelescope

III. METEOROLOGY

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An "Izvestiya" Report: Automatic Meteorological Stations Established in Turkmeniya

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Ashkhabad. 7 June. (By telephone from our correspondent). Automatic radio-

meteorological stations have been established in inaccessible mountain and desert regions of Turkmeniya. The first of these is operating at an elevation of 1,800 meters above sea level on the "Bolshoy Balkhan" Range. Data arrive at the capital of the Republic four times each day from these points. The data includes information about air temperature, pressure, wind velocity and direction, precipitation, and the number of hours of sunshine. This year automatic meteorological stations are beginning to operate in Zaunguzskikh Kara-Kumakh, on the Ust-Urt Plateau and on the eastern shore of the Caspian.

The automatic meteorological stations also are of help to hydrologists. Automatic radio precipitation gauges have been established in the Kopet-Dagh Mountains in those places where considerable freshets are usually formed after rains. They accurately report on the time and amount of precipitation. This information makes possible timely warnings to the populace of the approach of high water and makes it possible to take measures for the safeguarding of populated places, roads and communication lines. ("Automatic Stations Watch the Weather", unsigned article, Izvestiya, 8 June 1960, p. 6)

The Character of the Intertropical Convergence Zone

Khromov feels that until now our factual information about the structure of the intertropical convergence zone has been extremely limited; this is because the observation net over the oceans in the equatorial latitudes has been too sparse to reveal the details of this structure on synoptic maps or on vertical cross section. It is for this reason that observations made aboard ships that are crossing the intertropical convergence zone are of great importance.

The expeditious ship Ob', with the author aboard, has crossed this zone on a number of occasions in both the Indian and Atlantic Oceans. The observations made are for only a few short periods of time and no conclusions can be based on these individual cases, but the work was carefully done and warrants study. It is interesting to note that changes in circulation in the equatorial zone in the Indian Ocean were of a totally different character from those in the Atlantic. ("On the Problem of the Character of the Intertropical Convergence Zone", by S. P. Khromov, Izvestiya Vsesoyuznogo Geograficheskogo Obshchestva, Vol. 92, No. 2, 1960, pp. 115-123)

Monsoonal Characteristics of Atmospheric Circulation in the Soviet Arctic

The subject of monsoonal circulation of the atmosphere in the Arctic is not a new field of inquiry, as evidenced by the 12-item bibliography accompanying this article. Shapayev's article, accompanied by winter and summer maps showing representative conditions, represents a major contribution to the literature on this subject. ("Monsoonal Characteristics of Atmospheric Circulation in the Soviet Arctic", by V. M. Shapayev, Izvestiya Vsesoyuznogo Geograficheskogo Obshchestva, Vol. 92, No. 2, 1960, pp. 176-180)

IV. GLACIOLOGY

Report on Glaciological Activity on Mt. Kazbek -- A full translation

The silent and eternal snow of Kazbek. Tremendous glaciers -- Devdorak-skiy, Abano, Suatis, descend from the rock masses. Nestled on one of these glaciers, Gergetskiy, is a meteorological station of the Administration of the Hydrometeorological Service of the Georgian SSR.

The glaciologists V. Sh. Tsomaya and O. A. Drobyshev have recently returned from there.

There had been a joyous meeting with the men who have spent the winter on Kazbek. There were eleven of them there. It was an amicable and experienced group.

The head of the station is a young specialist named Shota Gudushauri who graduated from Tiflis University only three years ago. Other workers at the station are still younger. The glaciologist Vladimir Potapov, for example, is only eighteen years old. Sh. G. Tseretel', who has already lived for eleven winters on the glacier, is called the "father of the winterers". As senior technician and observer he knows well the fields of meteorology, actinometry and glaciology.

Day and night the people at Kazbek are making observations on the speed and direction of the wind, humidity and air temperature, and solar radiation; they are determining the amount of precipitation falling each day and all these data are regularly transmitted by radio to Tiflis.

On Kazbek there are 1,390 glaciers with a total area of 1,970 square kilometers. The center of glaciation is a high-mountain area between El'brus and Kazbek. The glaciers are of great importance for the economic life of Georgia and neighboring republics. Many rivers originate in them. The study of the glaciers of the Caucasus has continued for a hundred years. Data enable us to conclude that there is a close relationship between the condition of the glaciers and the climate.

Glaciers have their own "life". Thus, for example, during the last hundred years the Gergetskiy glacier has decreased 1,072 meters in length. In our own day it is retreating still more rapidly and in the last eight years it has decreased 142 meters in length.

The boundaries of the eternal snows are also changing. Since 1911 they have moved upward by 200 to 300 meters and are now situated at a height of 3,400 to 3,700 meters above sea level.

The scientific workers must often overcome great difficulties. It is difficult to work in snowstorms when a wind of hurricane force knocks a person from his feet and nothing is visible three paces ahead. In November and December the falling and blowing of snow become almost continual. The wind velocity in these areas attains 50 and even 70 meters per second. In one case the wind tore the roof off the main building at the station and last winter it even broke the anemometer itself. The instrument became "stuck", indicating a wind velocity of 87 meters per second.

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It is especially dangerous to leave the station when tremendous snowslides may occur unexpectedly. In places where there is danger of slides it is not only impossible to shoot a gun, but even to converse in loud tones. A high wind, the falling of snow, a sound wave -- all can set enormous masses of snow into motion.

One spring the scientist V. Surguladze lowered himself to the bottom of a crevasse. Suddenly he saw a frightful sight: standing amidst the blocks of ice -- with arms outstretched -- was a man who had been encrusted with ice. He had evidently become stuck in the shallow crevasse in this pose and had frozen to death. When the upper layer of snow had thawed away his body appeared in view. This was one of the alpinists who had disappeared without a trace six months earlier while he was descending from Mt. Kazbek.

Now such tragedies will no longer be repeated here. The people have learned the mountains and the ice; they have learned to overcome difficulties and they always know how to assist one another in misfortune.

The existing station is equipped with instruments for all kinds of observations. Self-recording barographs indicate air pressure; within a booth there are [automatic] thermographs and hygrographs for the recording of temperature and humidity; a Tretyakov rain gage is used for the measurement of all kinds of precipitation. The density of the snow is studied by means of snow-measuring staffs and a densimeter. Cloud heights are measured by pilot balloons. Various kinds of actinometric instruments are situated in the southeastern part of the observation area; these are used to determine solar radiation and the intensity and duration of the Sun's rays coming from above and reflected from the ice surface.

The proud and inaccessible Kazbek is bowing to the will of Man. Alpinists are more and more commonly reaching its peak. Eleven courageous and hardy workers at the station are working all year above the clouds and are reporting by radio all kinds of information about the weather, solar radiation and the movement of the glaciers. ("Winters Above the Clouds", by G. Klevakin, Ogonek, No. 9, February 1960, p. 6)

Major Article Now Available on the "Glaciation of El'brus"

A 12-page article (including a large fold-out map) in a recent issue of the Izvestiya of the All-Union Geographical Society contains a wealth of material on glaciation on Mt. El'brus and is doubtlessly the definitive paper available on this subject. The article is accompanied by a 15-item bibliography. ("The Glaciation of El'brus", by P. A. Ivan'kov, Izvestiya Vsesoyuznogo Geograficheskogo Obshchestva, Vol. 92, issue 2, pp. 124-133)

V. SEISMOLOGY

Soviet Innovation in Seismic Exploration of the Sea

The following is a summary of a brief article appearing in Nedelya, the Sunday supplement of the newspaper Izvestiya:

The workers of the All-Union Scientific Research Institute on Geophysical Research Methods have devised a procedure to follow during seismic exploration at sea to avoid the killing of great numbers of fish when seismic explosions are set off.

The following is the method proposed by workers in the Torpedo Laboratory, under the direction of S. A. Lovl'.

It was necessary to decrease the speed of the detonation; in modern explosive substances this speed is immense: the pressure increases a thousand times in several seconds. But the scientists found a simple solution. They divided the charge into a great number of parts and put "partitions" between them. These partitions delay the explosion of adjoining parts of the charge and the increase in pressure takes place slowly. Under these circumstances the fish "adjust" to it and do not perish. The energy of the explosion remains as before. ("Softened Explosions", by V. Azernikov, Nedelya, No. 15, 5-11 June 1960, p. 7)

VI. ARCTIC AND ANTARCTIC

CPYRGHT

CPYRGHT

The Atomic-Powered "Lenin" Sails Smoothly into the Arctic Sea

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| <p>Aboard the atomic-powered vessel "Lenin", 6 June.</p> <p>ship of the <u>icebreaker</u> fleet has moved on to a new research area. Stretching out to the horizon is continuous ice, type 10, with ice piled up in hummocks. But the Sun is with us and shines brightly around-the-clock. Here and there dark blue thawed patches of "lakes" have appeared. Spring has come to the Arctic.</p> | <p>(By radio) The flag-</p> |
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The Arctic has never seen such a powerful ship. The atomic-powered ship moves forward at a speed of 10 to 12 knots through the type-10 hummocky ice; it does not change course or back up, nor does it need to gather momentum to overcome the hummocky ice by repeated blows!

The "bridge" of the ice-cutter constantly maintains communications with its air reconnaissance. Recently a container holding an ice reconnaissance map was dropped onto the deck from an "IL" aircraft. It showed the location of an "opponent" worthy of the atomic-powered ship -- a field of perennial pack ice.

The ship came to a stop while forcing the solid ice. Members of the expedition went out on the ice and made a number of observations. At the same time a comradely football game was played near the port side; the game was between the sportsmen of the central compartment and a combined team from the other services. The spectators used the upper deck for a grandstand.

The atomic-powered vessel is maintaining course for the northeastern part of the Barents Sea. ("In the Light of the Polar Day", by A. Stefanovich, Pravda, 7 June 1960, p. 4) CPYRGHT

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